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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,610	07/09/2003	Yixiang Duan	S-100,580	3355
35068 7590 10/25/2007 LOS ALAMOS NATIONAL SECURITY, LLC LOS ALAMOS NATIONAL LABORATORY PPO. BOX 1663, LC/IP, MS A187 LOS ALAMOS, NM 87545			EXAMINER MAYEKAR, KISHOR	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 10/25/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/616,610	<b>Applicant(s)</b> DUAN, YIXIANG	
	<b>Examiner</b> Kishor Mayekar	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 August 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,5-9,12-15 and 17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 5-9, 12-15 and 17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 16 August 2007 has been entered.

### *Claim Rejections - 35 USC § 112*

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite because of the recitations "sending active reaction gas", "sending plasma support gas", and "such that as active reaction gas" without any

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correlation to the identical recitations of the gas in "a supply of active reaction gas" and "a supply of plasma support gas". Should it be for example "sending the plasma support gas"?

In claim 17, the same is applied to claim 1.

***Claim Rejections - 35 USC § 103***

4. Claims 1 and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowers (US 5,830,540) in view of either Dong et al. (US 7,079,370 B2) or Kusano et al. (US 5,466,424), <sup>all</sup> ~~both~~ references cited in previous Office actions. Bowers' invention is directed to an apparatus for reactive plasma surfacing of a object at atmospheric pressure. Bowers discloses in Figs. 1-3 that the apparatus comprises the recited housing, discharge chamber, first and second planar electrodes, supply of an active reaction gas, and supply of a plasma support gas, wherein the active reaction gas is surrounded by the plasma support gas as both the active reaction gas and plasma support gas flow through the discharge chamber. The difference between Bowers and the above claims are the provision of the recited active reaction gas tube and plasma support gas tube. Dong teaches in an apparatus for plasma treating a surface of an object the provision of the recited limitations (Figs. 1 and 14). Kusano teaches the provision of a gas tube in fluid communication with a discharge member (Fig. 1). The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified Bowers as shown by either Dong or Kusano because this would result in

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providing an inlet of the active reactive gas and an inlet of the plasma support gas to the discharge member.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bowers' 540 as modified by either Dong '370 or Kusano '42 4 as applied to claims 1 and 12-15 above, and further in view of Banks et al. (US 5,693,241). The difference between Dong as applied above and the instant claim is the provision of flowmeter. Banks, another reference cited in the last Office action, shows the limitation in a plasma surface treating apparatus (Fig. 2). The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the references' teaching as suggested by Banks because this would result in control flow of the gas.

6. Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowers' 540 as modified by either Dong '370 or Kusano '304 as applied to claims 1 and 12-15 above, and further in view of either Tada et al. (US 5,857,888) or Brooks et al. (US 6,956,329 B2) and Duan et al. (US 6,734,964 B1). The differences between the references as applied above and the instant claim are the provision of the recited power source. Tada teaches in a method of manufacturing a plasma torch electrode the provision of a power supply connected to a pair of electrodes where the power supply provides voltage pulses (Fig. 1 and col. 4, lines 13-24). Brooks teaches in an apparatus for forming a high pressure plasma

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discharge column the energization of the plasma by an electrical arc discharge between a pair of electrodes in a steady state or pulsed manner (Fig. 4a and col. 9, line 57 through col. 10, line 19). Duan, another reference cited in a previous Office action, teaches in an apparatus for generating atmospheric pressure plasma the provision that a power source connected to a pair of electrodes (Fig. 1 and col. 4, lines 23-60). The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the references' teaching as suggested by either Tada or Brooks because the provision of a power supply connected to the first and second electrodes would result in energization of the plasma.

As to the subject matter of claims 8 and 9 the selection of any of known equivalent power source for providing a direct current would have been within the level of ordinary skill in the art.

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bowers' 540 as modified by either Dong '370 or Kusano '304 and Dong et al. (US 2004/0211675 A1). The further difference between the references as applied above and the above claims are the provision that apparatus comprises a plurality of atmospheric plasma devices. Dong, a reference cited in the last Office action, teaches in Fig. 9c the provision of two devices for generating atmospheric plasma. The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have

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modified the references' teaching as suggested by Dong '675 because the provision of a plurality of atmospheric plasma devices would be within the level of ordinary skill in the art for treating larger surface and/or increasing the throughput.

### *Response to Arguments*

8. Applicant's arguments filed 16 August 2007 have been fully considered but they are not persuasive because of the new ground of rejections as set forth in the paragraphs above.

### *Conclusion*

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kishor Mayekar whose telephone number is (571) 272-1339. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on

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access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Kishor Mayekar  
Primary Examiner  
Art Unit 1753